



Government of the people's Republic of Bangladesh  
Ministry of Housing and Public Works  
Urban Development Directorate  
82 Segunbagicha, Dhaka-1000

PREPARATION OF DEVELOPMENT PLAN FOR MEHERPUR ZILLA

## REPORT ON ASSIGNMENT-3

# Prepared Ward wise Urban Area Plan map and generate statistics

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## **Summary of Assignment-3**

### **A. Summary of Assignment-3**

This report summarizes Assignment-3 according to the ToR by the Junior GIS Consultant (Individual Consultant) for the “Preparation of Development Plan for Meherpur Zilla "project. The assignment has done by me is “Prepared Ward Wise Urban Area Plan Map and generate statistics”. The detailed process is also summarized in the Report. For the Urban area Plan, the study of Ward No. 2 of Gangni Municipality was conducted using data from the Socio-Economic Survey, Physical Survey, and BBS (2022), which provided a detailed understanding of the ward’s existing conditions. Key problems were identified through the Socio-Economic Survey, Participatory Rural Appraisal (PRA), and newspaper reports, reflecting both community perspectives and documented challenges. Based on these findings, planning interventions were proposed to address priority issues and promote sustainable development. The resilience of the ward was further analyzed to assess its capacity to cope with shocks and adapt to future changes, and its current phase within the adaptive cycle was determined. Finally, the interventions were prioritized according to urgency and feasibility, and relevant implementation authorities were designated to ensure effective execution.

(Md. Kamrul Hasan)

Junior GIS Consultant

# Prepared Ward Wise Urban Area Plan Map and generated statistics

## Existing Situation Ward 2:

Ward No. 2 of Gangni Pourashava, located in Gangni Upazila of Meherpur District, is a growing urban settlement with mixed land use and diverse socio-economic dynamics. According to the Population and Housing Census 2022, the ward has a population of 3,303 people—1,538 males and 1,765 females—distributed across neighborhoods such as Bon Bivag Para, Bashbaria Uttar Para, and Shishir Para, Math Para (BBS, 2022). Population projections show steady growth from 3,379 in 2026 to 3,788 in 2046, reflecting gradual demographic expansion. The road network covers 9.90 km, comprising 6.86 km of BTR, 1.36 km of earthen, 0.74 km of HBB, and 0.94 km of RCC roads (Physical Feature Survey, 2025), highlighting the need for mobility improvements. Educational indicators reflect moderate literacy rates of 71.75% (5+ years), 72.05% (7+ years), and 67.94% (15+ years), with a total of 756 students aged 5–29 enrolled, where female participation (405) slightly exceeds male (351), showing a positive shift toward gender balance (BBS, 2022).

Despite these strengths, development challenges remain. Index analysis (Socio-Economic Survey, 2025) shows: PQLI 46, Poor, due to weak literacy, life expectancy, and infant mortality; QLI 71, Moderate, highlighting service and infrastructure gaps; CCI 76, High, reflecting strong cultural participation; and IQLI 64, Moderate, indicating infrastructure limitations. Daily travel is largely shaped by education, marketing, and household needs, reflecting community socio-economic activity. The Ward 2 action plan is therefore designed to address drainage congestion, scattered waste disposal, and limited community services through improved infrastructure, land use planning, and resilience-building measures. It also evaluates the ward's resilience, identifying its phase of development and examining land use patterns to guide sustainable urban growth. These overlapping social, economic, and environmental dynamics place Ward 02 in the Reorganization ( $\alpha$ ) phase of the Adaptive Cycle, where fragmented systems, unmanaged growth, and overstressed services highlight the urgent need for planned interventions to ensure long-term resilience and sustainable urban development.

Feature	Existing Situation
Occupational Analysis	Service holder: 0%, Business: 53%, Driver: 11%, Worker: 11%, Education: 11%, Medical service: 11%, Farmer: 5%. Formal employment: 20%, Informal employment: 80%. (Source: Socio-Economic Survey, 2025)
Transportation Analysis	By foot: 27.31%, Rickshaw: 27.31%, Van: 26.94%, Cycle: 6.27%, Motorcycle: 8.49%, Bus: 3.32%, Others: 0.04%. Non-motorized: 87.87%, Motorized: 12.13%. Gender-wise: Female depend mainly on walking (30.10%), van (27.60%), and rickshaw (28.50%), while males rely on walking (25.00%), rickshaw (26.35%), van (26.35%), and motorcycle (12.16%). (Source: Socio-Economic Survey, 2025)
Drainage System	Covered drains: 0 km, Uncovered drains: 0.103 km. (Source: Physical Feature Survey, 2025)
Building Type	Katcha: 127, Pucca: 812, Semi-Pucca: 915, Tin Shade: 631, Under Construction:

Feature	Existing Situation
	27. (Source: <i>Physical Feature Survey, 2025</i> )
Building Floor Distribution	1 floor: 2,314; 2 floors: 143; 3 floors: 45; 4 floors: 7; 5 floors: 3. (Source: <i>Physical Feature Survey, 2025</i> )
Elevation Profile (DEM)	11.28–13.86 m (higher elevation): settlements, institutions, commercial areas—less flood-prone, suitable for dense housing and services. 8.73–11.27 m (lower elevation): agriculture, open land, waterbodies—prone to seasonal waterlogging, used for farming and ponds, with sparse settlements. (Source: <i>Physical Feature Survey, 2025</i> )
Land Use Status	Residential: 150.681 acres (34.73%), Agriculture: 249.44 acres (57.64%), Education: 3.494 acres (0.81%), Administrative: 2.046 acres (0.47%), Mixed use: 8.751 acres (2.02%), Waterbody: 5.300 acres (1.22%), Circulation: 11.464 acres (2.64%), Utility services: 0.028 acres (0.01%), Commercial: 0.989 acres (0.23%), Community services: 0.325 acres (0.07%), Health facilities: 0.278 acres (0.06%), Open space: 0.085 acres (0.02%). (Source: <i>Physical Feature Survey, 2025</i> )
Utility Services	Deep tube wells: 187, Informal dustbins: 2, Street lights: 16. (Source: <i>Physical Feature Survey, 2025</i> )

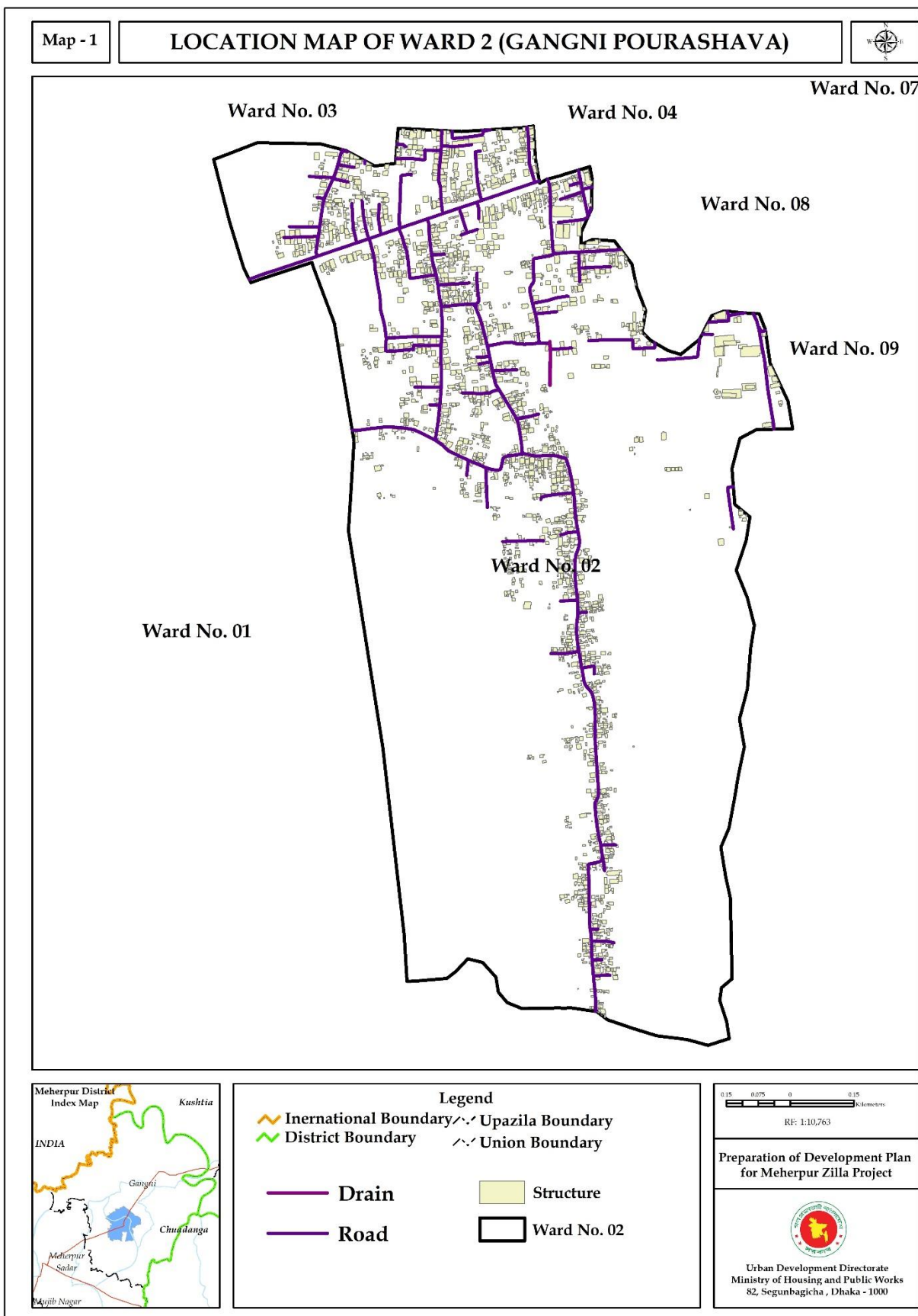
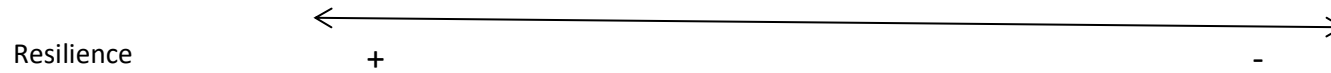


Figure 1: Location Map of Ward 2

**Problem Identification:**

Source	Key Problems Identified
PRA	<ul style="list-style-type: none"><li>• New road in front of the Forest Department area.</li><li>• In front of the Post Office, need drain in College Road.</li><li>• Need to provide a fixed rule from Pourashava to build a building. They don't offer space to build a Road</li><li>• Need to repair some roads near the Gangni Degree College and the Forest Department. We need to cover the drain and repair it so that water can flow through it.</li><li>• Need proper steps of Gangni Pourashava for Solid waste and sewerage disposal management, and provide permanent dustbins.</li><li>• There is a need for a drinking water supply around the full ward.</li><li>• Need street lights to reduce crime. (According to Priority of PRA)</li></ul>
Socio-Economic Data	<ul style="list-style-type: none"><li>• No Park and Recreational Place</li><li>• No Street Light on the Road</li><li>• No Speed Breaker on the Road</li><li>• No Solar Electricity system</li><li>• No Drain in the Ward</li><li>• No Supply water Pipe Line</li><li>• No Public Toilet</li></ul>
Newspaper	<ul style="list-style-type: none"><li>• 9 killed in head-on collision between truck carrying corn and passenger Laguna near Forest Department Gangni( <a href="https://www.meherpurpratidin.com/গাংনীতে-ট্রাক-ও-লেগুনার-স/">https://www.meherpurpratidin.com/গাংনীতে-ট্রাক-ও-লেগুনার-স/</a> )</li></ul>

### Adaptive Cycle Phase Analysis:



Adaptive Cycle Phase	Release ( $\Omega$ )	Reorganization ( $\alpha$ )	Growth ( $r$ )	Conservation ( $K$ )
<b>Social System</b>	One population overwhelms all others, which disappear, or a revolt occurs, breaking the homogeneity of the space.	Heterogeneous populations mixing at the individual level; and absence of barriers.  Mainstreaming (residents and explorers) and marginal (drug traders and sex workers) are present.	Selected populations begin to grow; the mainstream populations may begin to overtake marginal populations.  Space encourages inclusion.	One population may begin to dominate; Population in the area becomes homogeneous.  Segregation occurs are barriers, both physical and implied, rise.
<b>Economic System</b>	Small permutation in customer or market yields collapse	Small, opportunistic, and temporary business emerges.	Entrepreneurs create highly flexible businesses.  Imported or local response to local needs.	Large-scale economic entities emerge emphasizing “one size fits all”  Efficiency is paramount: customization disappears and the system is inflexible.
<b>Environmental System:</b>	Out of bounds event overwhelms engineered and separated system.	Spontaneous and visible natural processes in the site.	Designed, visible Reinforcing the connection to other systems.	Engineered, hidden Separates the bio-system from others Inflexible.
<b>Results</b>	<b>Unmanaged Sprawl:</b> The primary issue is the unplanned and rapid conversion of land from its current use, such as agriculture, to urban	<b>Lack of Infrastructure:</b> Areas begin to reorganize, the public infrastructure (roads, water, sewage) may not keep pace with the development.	<b>Congestion &amp; Overburdened Infrastructure:</b> As the population and economic activity increase, the existing infrastructure can become overstretched, leading to traffic	<b>Stagnation:</b> The strong emphasis on stability can lead to stagnation, preventing necessary upgrades to infrastructure and amenities.  <b>Rigidity:</b> A rigid system of

	<p>development. This leads to the loss of valuable farmland and natural spaces.</p> <p><b>Vulnerability:</b> Areas in this phase are highly vulnerable to uncontrolled change, which can overwhelm existing infrastructure and services.</p>	<p><b>Ad-hoc Growth:</b> Without a clear plan, the reorganization can lead to scattered and uncoordinated development, making it difficult to provide efficient public services in the future.</p>	<p>congestion, strain on the water supply, and inadequate sanitation.</p> <p><b>Environmental Degradation:</b> Rapid development can lead to the loss of urban green spaces and a decline in air and water quality.</p>	<p>conservation can prevent the area from adapting to new social or economic needs, potentially hindering long-term sustainability.</p> <p><b>Resistance to Change:</b> The population in this phase may resist new development or changes, which can slow down progress and prevent the area from evolving.</p>
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- (Source: Anderson, 2011)
- Source: Marcus, L., & Colding, J. (2023). Placing Urban Renewal in the Context of the Resilience Adaptive Cycle. Land. <https://doi.org/10.3390/land13 010008>.
- Source: Peng, H., Lou, H., Liu, Y., He, Q., Zhang, M., & Yang, Y. (2025). Spatial and Temporal Evolution Assessment of Landscape Ecological Resilience Based on Adaptive Cycling in Changsha Zhuzhou–Xiangtan Urban Agglomeration, China. Land. <https://doi.org/10.3390/land14040709>.
- Source: Wang, Z., Lin, L., Zhang, B., Xu, H., Xue, J., Fu, Y., Zeng, Y., & Li, F. (2023). Sustainable urban development based on an adaptive cycle model: A coupled social and ecological land use development model. Ecological Indicators. <https://doi.org/10.1016/j.ecolind.2023.110666>.
- Source: Marcus, L., & Colding, J. (2023). Placing Urban Renewal in the Context of the Resilience Adaptive Cycle. Land. <https://doi.org/10.3390/land13010008>.



## Urban Resilience

Ward 02 of Gangni Municipality is situated in the Reorganization ( $\alpha$ ) phase of the Adaptive Cycle, where systems are attempting to reorganize but remain unstable. From the social perspective, the ward hosts a heterogeneous mix of residents. Limited educational land (only 3.5 acres) and low-quality infrastructure further constrain social development. The economic system is dominated by small-scale businesses (53%) and farming (5%), which provide livelihoods but lack diversification and stability; informal roadside trading has emerged due to insufficient commercial land, reflecting opportunistic but unsustainable growth. On the environmental side, large areas of agriculture are under pressure from encroachment, while inadequate drainage and poor waste management contribute to waterlogging and pollution, undermining ecological balance. These conditions collectively result in unmanaged sprawl, vulnerability to sudden change, overstressed infrastructure, and environmental degradation, preventing Ward 02 from transitioning to the Growth (r) phase. To move forward, compact vertical housing, expanded civic facilities, and strict protection of agricultural and natural spaces are essential for strengthening its urban resilience.

### Urban Resilience Analysis for Ward 02:

Adaptive Cycle Phase	Problem arises in ward 02	Planning Intervention	Implementation Authority
<b>Reorganization (<math>\alpha</math>)</b>	<b>Lack of Infrastructure:</b> <ul style="list-style-type: none"> <li>Need to repair some roads near the Gangni Degree College and the Forest Department. We need to cover the drain and repair it so that water can flow through it.</li> <li>In front of the Post Office, need drain in College Road</li> <li>New road in front of the Forest Department area.</li> <li>No Park and Recreational Place</li> <li>No Street Light on the Road</li> <li>No Speed Breaker on the Road</li> <li>No Supply water Pipe Line</li> <li>No Public Toilet</li> </ul>	<ol style="list-style-type: none"> <li>1. Agriculture area Protection (<math>\approx 58\%</math>, 250 ac), no need to increase. The current amount is enough, but we need to preserve it. (<i>Source: FAO Urban Agriculture Guidelines</i>)</li> <li>2. Residential Area protection (<math>\approx 35\%</math>, 151 ac), no need to increase. For the Residential Area, there is a need for Vertical Development with floors and to maintain the Green Building code. (<i>Source: Adaptive Reorganization Stage – Holling &amp; Gunderson, The standards of UDD for Small Towns of Bangladesh</i>)</li> <li>3. Mixed Use Area (<math>\approx 2\%</math>, 9 ac) needs to increase. Mixed-use area needs to increase on both sides of Meherpur Khushtia road near Sorowar</li> </ol>	Recreational Place implemented by LGED (Local Government Engineering Department) in collaboration with the Municipality.

	<p><b>Ad-hoc Growth:</b></p> <ol style="list-style-type: none"> <li>1. Oversupplied residential land (151 ac) → scattered housing without coordination. <i>(Source: Physical Feature Survey)</i></li> <li>2. Predominance of katcha &amp; tin-shade housing → unplanned, low-rise sprawl instead of vertical growth. <i>(Source: Physical Feature Survey)</i></li> <li>3. Encroachment risk on agricultural land (250 ac) due to uncontrolled expansion. <i>(Source: Physical Feature Survey)</i></li> <li>4. Very low land for community services (0.325 ac, only 0.07%) → settlements grew without space for health, recreation, or civic uses. <i>(Source: Physical Feature Survey)</i></li> <li>5. Commercial and mixed-use areas underdeveloped → leads to informal roadside businesses. <i>(Source: Physical Feature Survey)</i></li> </ol>	<p>Terminal by 1.5 - 2 Acres <i>(Source: Resilience Planning &amp; Informal Economy Integration)</i></p> <ol style="list-style-type: none"> <li>4. Education Institution and Civic Facility (≈4 ac) needs to increase, but according to the population, the current amount is enough. <i>(Source: Community Anchor Spaces in Resilient Cities)</i></li> <li>5. Open Space &amp; Recreation area (0.085ac→ 4–5 ac) needs to increase. Open spaces and Recreation areas need to be built up at the Urban Void area of Ward 2. (Figure 2)<i>(Source: BIP Standards; Dhaka/BanglaJOL review, The standards of UDD for Small Towns of Bangladesh)</i></li> <li>6. Transport &amp; Mobility (87.9% non-motorized), so we need to preserve and repair the walkway <i>(Source: World Bank / CTCN / VTPI on NMT benefits)</i></li> </ol>	
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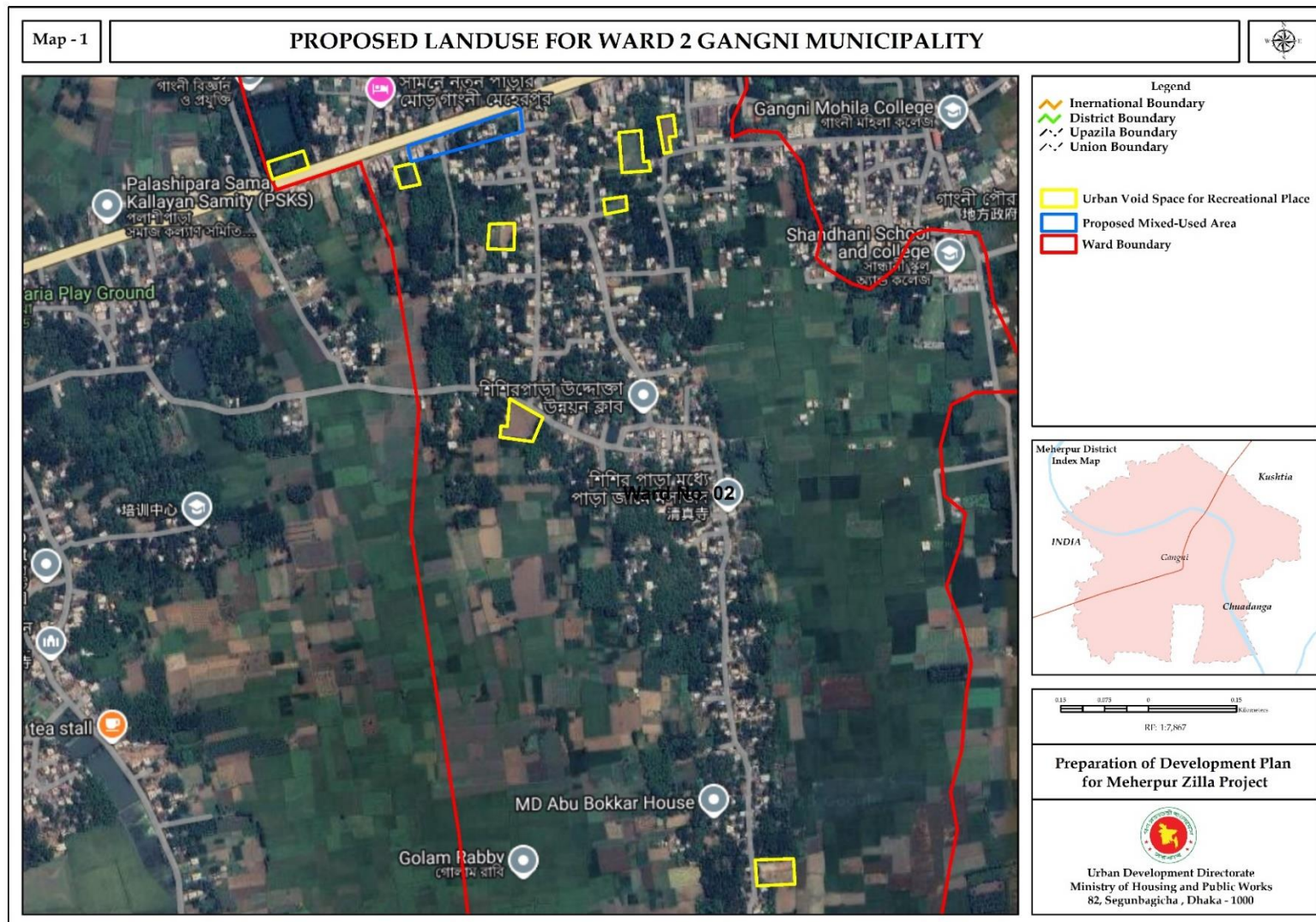


Figure 2: Proposed Land Use of Ward 2

